Name _____

History of Ice Cream

Once upon a time, hundreds of years ago, Charles I of England hosted a sumptuous state banquet for many of his friends and family. The meal, consisting of many delicacies of the day, had been simply superb but the "coup de grace" was yet to come. After much preparation, the King's french chef had concocted an apparently new dish. It was cold and resembled fresh-fallen snow but was much creamier and sweeter than any other after-dinner dessert. The guests were delighted, as was Charles, who summoned the cook and asked him not to divulge the recipe for his frozen cream. The King wanted the delicacy to be served only at the Royal table and offered the cook 500 pounds a year to keep it that way. Sometime later, however, poor Charles fell into disfavour with his people and was beheaded in 1649. But by that time, the secret of the frozen cream remained a secret no more. The cook, named DeMirco, had not kept his promise.

This story is just one of many of the fascinating tales which surround the evolution of our country's most popular dessert, ice cream. It is likely that ice cream was not invented, but rather came to be over years of similar efforts. Indeed, the Roman Emperor Nero Claudius Caesar is said to have sent slaves to the mountains to bring snow and ice to cool and freeze the fruit drinks he was so fond of. Centuries later, the Italian Marco Polo returned from his famous journey to the Far East with a recipe for making water ices resembling modern day sherbets.

In 1774, a caterer named Phillip Lenzi announced in a New York newspaper that he had just arrived from London and would be offering for sale various confections, including ice cream. Dolly Madison, wife of U.S. President James Madison, served ice cream at her husband's Inaugural Ball in 1813. Commercial production was begun in North America in Baltimore, Maryland, 1851, by Mr. Jacob Fussell, now known as the father of the American ice cream industry. The first Canadian to start selling ice cream was Thomas Webb of Toronto, a confectioner, around 1850. William Neilson produced his first commercial batch of ice cream on Gladstone Ave. in Toronto in 1893, and his company produced ice cream at that location for close to 100 years. The ice cream division of Neilson was recently purchased by Ault Foods of London, Ont.

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http://www.foodsci.uoguelph.ca/dairyedu/findsci.html

Science of Ice Cream

Making ice cream at home requires the use of an ice cream machine. The "homemade" or hand-crank freezer used was the forerunner to today's modern equipment. Many people enjoy fond memories of hot summer days spent preparing the ice cream mix, loading the bucket with ice and salt, and cranking the freezer for a half hour until it was considered too stiff to continue or until one's hunger got the best of them. All of the various steps in making ice cream via the bucket are similar to the commercial processing stages. The mix is prepared and pasteurized, aged, dynamically whipped and frozen in a freezer equipped with blades and dashers, and then hardened prior to consumption. Ice and salt are used, however, rather than the ammonia or Freon jacket in the commercial freezer above.

The concept of melting ice with salt is not new to anyone in this latitude. Indeed, our roads, driveways, and sidewalks are kept bare in the winter by such a process. As salt is applied to ice, a concentrated brine solution forms on the ice, which has a very low freezing point. The freezing point of a 20% solution of salt is -16.6^{o}C. As a result, more ice melts to dilute this solution, until the freezing point of the solution matches the outside temperature (equilibrium is established). The same phenomenon is occuring in the brine solution in the ice cream freezer. As the salt continues to dissolve more ice melts to accommodate this concentrated salt solution with its very low melting point. At the same time, both the heat of solution of the dissolving salt, and the latent heat of fusion of the melting ice are adsorbed from the ice itself, thereby lowering the temperature of the salt, ice and brine mixture. The temperature of this mixture can be controlled by the amount and ratio of salt and ice present. As examples, consider the following data: a 2% NaCl (salt) solution has a freezing point of -1.4^{o}C, 5% salt conc. = -3.5^{o}C, 10% salt = -7.4^{o}C, 15% salt = -11.7^{o}C and 20% salt = -16.6^{o}C. The lowest temperature which can be achieved with a sodium chloride brine is -20^{o}C, at a concentration of 23% salt. Higher concentrations result in salt crystallization.

This brine, in turn, is absorbing heat from the freezing ice cream inside the can, and thus ice and salt need to be continually added to keep the ice temperature low enough to freeze the ice cream. (Bear in mind that the freezing temperature of the ice cream is depressed below 0o due to the presence of dissolved sugars.) This process is a lesson in heat transfer in itself!

A Few Notes: